

Solid State Relay, ASSR Series

Evaluation Board



Data Sheet

Description

This evaluation board features Avago Technologies' Solid State Relay (SSR) with MOSFET output, ASSR Series, in 4 different IC package footprints. They are 8-Pin DIP with Gull Wing Surface Mount, 6-Pin DIP with Gull Wing Surface Mount, 4-Pin SO, and 4-Pin SSOP.

ASSR-xx2x Series, 2-form A (dual channel), is featured in 8-Pin DIP with Gull Wing Surface Mount footprint and offers 2 identical channels for evaluation. ASSR-xx1x Series, 1-form A (single channel) Solid State Relays are featured in the other 3 footprints on the evaluation board. In total, the board can accommodate up to 5 channels.

Input

The input channels of the ASSR series are LED driven, designated as "ANODE" and "CATHODE".

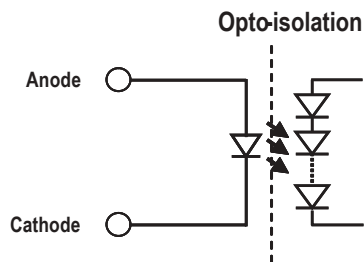


Figure 1. Input Stage of the ASSR Series

They are commonly driven by TTL or buffered CMOS logic gates. A current limiting resistor at each anode is usually required to limit the current through the LED to a proper value. The recommended input forward current is between 3mA and 20 mA. Thus, if driven by a 5V power supply, it is recommended to use a resistor value of 680 ohm. It provides a forward current between 5mA to 6.5mA where the temperature variation between -40 °C to 85 °C and a 10% tolerance of the resistor are taken into consideration.

Output

Each output pair of the ASSR Series is made up by two MOSFET devices with equivalent output voltage rating. The output traces from the MOSFET drains to the screw terminals are 50ohm lines, which can withstand 6A, 300Vac.

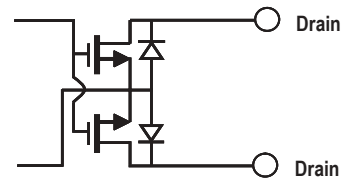


Figure 2. Output Stage of the ASSR Series

A load is required at the output port, which limits the current through the two MOSFET devices. For resistive load, its resistance should meet

$$R_{Load} \geq \frac{V_D}{I_{0\max}} - R_{on}$$

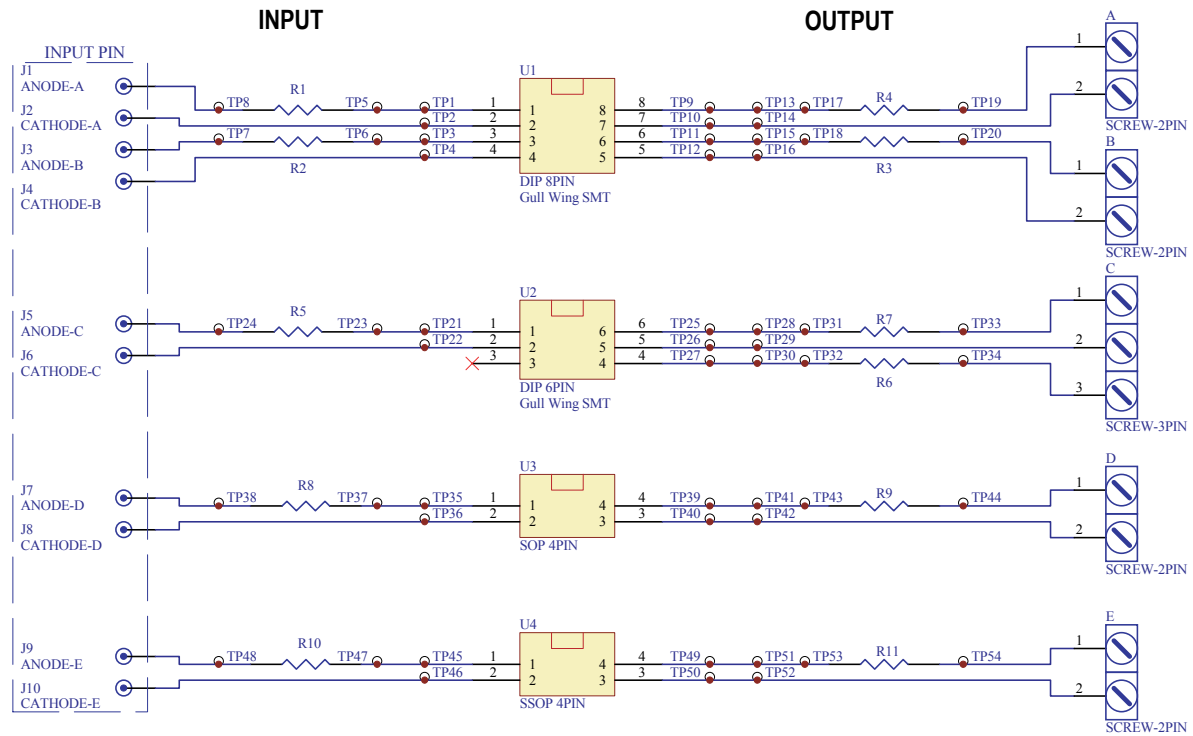
Where,

R_{Load} is the resistance of the resistive load,

R_{on} is the turn on resistance of the SSR, where $R_{on} = 60\text{ohm}$ can be used.

V_D is the voltage applied on the MOSFET drain, and $I_{0\max}$ is the recommended maximum output current.

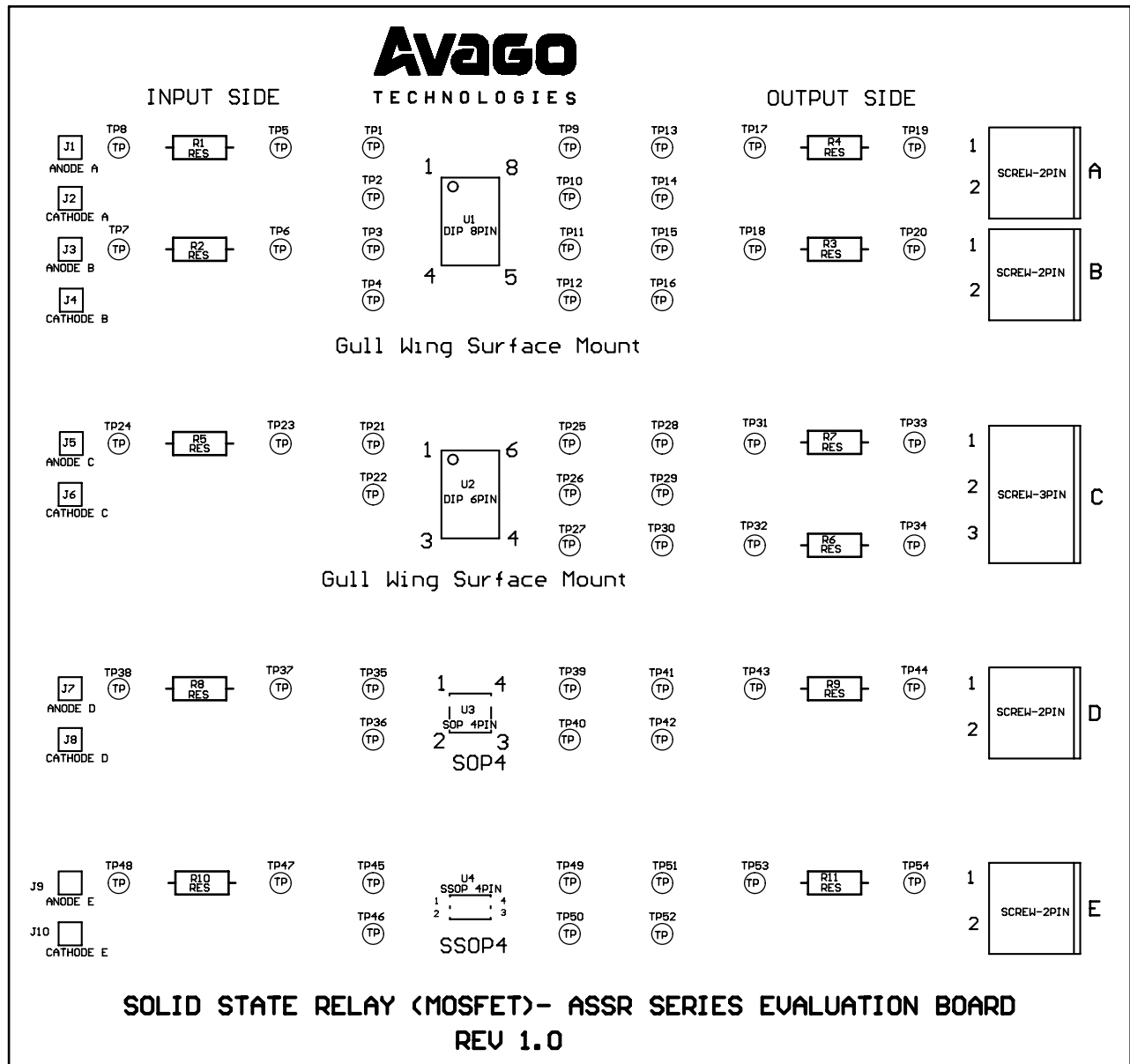
Schematic Diagram



The output lines to the screw terminals are 50ohms lines, which can withstand 6A, 300Vac.

Unpopulated Board

The evaluation PCB is 3" x 3". There are 4 mounting holes at each corner.



Top Assembly

Functional Diagram

Channel	Description	Functional Diagram	Remarks
A	U1, Gullwing Surface Mount 8-Pin, ASSR-xx2x-002E		
B	U1, Gullwing Surface Mount 8-Pin, ASSR-xx2x-002E		
C	U2, Gullwing Surface Mount 6-Pin, ASSR-xx1x-001E		
D	U3, Small Outline 4-Pin, ASSR-xx1x-003 E		
E	U4, Shrink Small Outline 4-Pin, ASSR-xx1x-006E		

Note: The functional diagrams are not drawn to scale.

Pinout Table

Channel	Description	Input Current	Output			Load Conditions
			1	2	3	
A	U1, Gullwing Surface Mount 8-Pin, ASSR-xx2x-002E	5mA nominal, 20mA max.	AC or DC Power	AC or DC load	N.A.	Refer to product datasheet
B	U1, Gullwing Surface Mount 8-Pin, ASSR-xx2x-002E	5mA nominal, 20mA max.	AC or DC Power	AC or DC load	N.A.	Refer to product datasheet
C	U2, Gullwing Surface Mount 6-Pin, ASSR-xx1x-001E	5mA nominal, 20mA max.	AC or DC Power	N.C.	AC or DC load	Refer to product datasheet
		5mA nominal, 20mA max.	DC Power	DC load	N.C.	Refer to product datasheet
		5mA nominal, 20mA max.	DC Power	DC load	DC Power	Refer to product datasheet
D	U3, Small Outline 4-Pin, ASSR-xx1x-003E	5mA nominal, 20mA max.	AC or DC Power	AC or DC load	N.A.	Refer to product datasheet
E	U4, Shrink Small Outline 4-Pin, ASSR-xx1x-006E	5mA nominal, 20mA max.	AC or DC Power	AC or DC load	N.A.	Refer to product datasheet

Operation

In the schematic diagram, R_1 , R_2 , R_5 , R_8 and R_{10} are the current limiting resistors before the input pins. If the LED is driven by a 5V power supply, a 680 ohm resistor can be used. In the schematic diagram, R_3 , R_4 , R_6 , R_7 , R_9 and R_{11} are the load. The impedance of the load should be sufficient enough to limit the output current to less than the recommended maximum output current.

When the LED is on (or power is applied to the LED), the SSR (MOSFET) turns on, current will flow through the load. When the LED is off (or there is no power applied to the LED), the SSR (MOSFET) turns off, there is no current flowing through the load.

For the operation of U2, the ASSR-xx1x-001E Series is packaged in a 6-Pin DIP with Gull Wing Surface Mount, but only five pins are used. Pins 1 and 2 are the anode and the cathode of the input LED, respectively, and Pin 3 is not connected (N.C.) internally. Pins 4, 5, and 6, at the output side can be configured as either Connection A or Connection B as shown in figure 3. With Connection A as shown in figure 3a, the signal at the output of the SSR can have either positive or negative polarity. This means that the ASSR Series can pass either ac or dc signals. With Connection B, the signal at the output of the ASSR must have its polarity as indicated in figure 3b. In this configuration, pins 4 and 6 are tied together, and the ASSR can control dc signals only. The advantage of using Connection B is that it places two output MOSFETs in parallel with each other, rather than in series. This configuration reduces

the output on-resistance of the ASSR significantly and increases its output current capability by a factor of two. Figure 3 also defines the polarity for the input side of the ASSR.

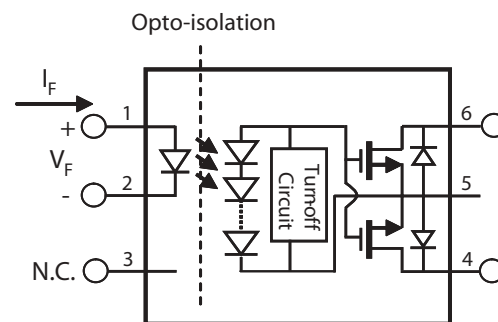


Figure 3a - Connection A (AC or DC)

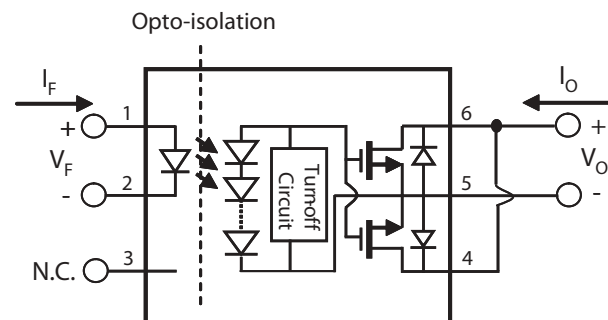


Figure 3b - Connection B (DC only)

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

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